

## REMARKS

Favorable reconsideration, reexamination, and allowance of the present patent application are respectfully requested in view of the foregoing amendments and the following remarks.

### Rejection under 35 U.S.C. § 103(a)

In the Office Action, beginning at page 2, Claims 1-7 and 10 were again, and Claims 11 and 12 newly, rejected under 35 U.S.C. § 103(a), as reciting subject matters that allegedly are obvious, and therefore allegedly unpatentable, over *Gutmark* in view of *Paschereit*. Claims 8 and 9 were also rejected under section 103(a) as allegedly being obvious over *Gutmark* and *Paschereit*, and further in view of *Neumeier*. Applicants respectfully request reconsideration of these rejections.

By way of the foregoing amendments, Claim 3 has been placed in independent form, including the subject matters of Claims 1 and 2. No new issues are raised by this amendment, as Claim 3 has already been acted on (twice).

Claim 1 relates to a method for affecting thermoacoustic oscillations in a combustion system having a combination of steps including, *inter alia*, coordinating the acoustic excitation of the gas flow and the modulated injection of the fuel to affect the same interference frequency of the thermoacoustic oscillations, and wherein the instantaneous acoustic excitation of the gas flow and the instantaneous modulated injection of the fuel are phase-coupled with said signal correlating with the thermoacoustic oscillations in the combustion system.

Claim 7 relates to a device for affecting thermoacoustic oscillations in a combustion system having a combination of elements including, *inter alia*, a control system which drives an at least one acoustic source and an at least one control valve to affect the same interference frequency of the thermoacoustic oscillations. Claim 9 relates to the device of Claim 8, wherein a first time delay element produces a phase shift different from that of a second time delay element.

The prior art, including *Gutmark*, *Paschereit*, and *Neumeier*, fails to identically disclose or fairly suggest the subject matters of the pending claims.

Applicant has, in the Amendment filed 14 November 2005, summarized portions of *Gutmark*, *Paschereit*, and *Neumeier*, and will therefore merely incorporate those comments by reference so as to not further burden the record.

Assuming *arguendo* that the person of ordinary skill in the art would somewhere find motivation to combine *Gutmark* and *Paschereit* in the manner alleged to be obvious in the Office Action, the resulting hypothetical construct would still not include each and every limitation of Claim 1. Stated simply, a simple combination of *Gutmark* and *Paschereit* according to the Office Action could at most lead to methods and systems having a single phase shift procedure for both the acoustic excitation and the fuel modulation. This hypothetical approach to dealing with oscillations is simply different from the subject of Claim 1, which includes, among other steps, two separate phase shift procedures, one for acoustic excitation and one for fuel modulation.

The Office Action assumes on page 5, second paragraph, that for each mode of oscillation a separate control path is provided, and that these modes of oscillations are the acoustic excitation and the fuel modulation. Contrary to the Office Action's reading of the prior art, *Neumeier* discloses methods and devices affecting thermoacoustic oscillations by driving a respective actuator, wherein measured signals are subjected to phase shift before generating a driver signal. *Neumeier* describes (at col. 5, lines 56 to 64, directly above the passage cited in the Office Action) that the measured signal includes modal oscillations having modal functions (amplitude and phase) and frequency. Depending on this input signal, *Neumeier*'s controller generates a control signal as an output signal to drive a (single) actuator. There is no disclosure or suggestion of providing different control signals for driving different actuators, as recited in the combinations of Claims 1 and 7.

For at least the foregoing reasons, Applicants respectfully submit that the subject matters of Claims 1 and 4-12, each taken as a whole, would not have been obvious to one of ordinary skill in the art at the time of Applicant's invention, are therefore not unpatentable under 35 U.S.C. § 103(a), and therefore respectfully requests withdrawal of the rejection thereof under 35 U.S.C. § 103(a).

**Obviousness-type Double Patenting Rejection**

In the Office Action, beginning at page 6, Claim 7 was again provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as reciting subject matter that is allegedly not separately patentable over the subject matter recited in Claim 7 of the '564 application. Applicants respectfully request reconsideration of this rejection.

The Office Action alleges, at page 6, that:

the structure recited in each of these claims is substantially identical. That the control systems function to affect different interference frequencies does not render the device claims distinct. This recited functioning of the control system is merely a recitation of the intended use of the control system and does not serve to structurally distinguish claim 7 of this application from claim 7 of [the '564 application].

Applicant strongly disagrees with Mr. Cocks' interpretation of the claim language, and thus his conclusions about the separate patentability of the two claims.

Mr. Cocks' opinion appears to be that the function of a control system does not limit that control system, and therefore all control systems are structurally identical; this is plainly incorrect. Following Mr. Cocks' statement to a logical conclusion, it would necessarily follow that no control system would ever be patentable, once a prototypical control system was described in the public literature. This would be because, despite the myriad functions of the control systems that are developed in numerous art areas, the fundamental hardware, on which the logic of the control would be implemented, pre-exists. Mr. Cocks' interpretation ignores both the fact that the U.S. Patent and Trademark Office ("PTO") weekly issues many patents for control systems, and also ignores the correct interpretation of the claim terms: the function of a control system DOES structurally limit an apparatus claim. Were Mr. Cocks' legal interpretation correct, every control system claim issued by the PTO would be facially invalid, because their recited functions would be non-limiting, not to mention numerous decisions by the various federal district courts and the Court of Appeals of the Federal Circuit would be subverted.

Instead, however, the different functions recited in Claims 7 of this and the '564

application limit the claims in which they appear, and are not merely recitations of intended uses of an apparatus. Accordingly, the claims have definitively different scopes, and the Office Action has not offered any explanation why the difference in these scopes would be unpatentable.

Furthermore, the device of Claim 7 of the '564 application patentably distinguishes from the device of Claim 7 of this application. In Claim 7 of the '564 application, the control system is adapted for driving the acoustic source(s) and the control valve(s) to simultaneously affect the at least two different interference frequencies. In this application, as indicated above, a control system is adapted for driving acoustic source(s) and control valve(s) to affect the same interference frequencies. In order to perform these different tasks, the control systems must be different, *e.g.*, with respect to the integrated hardware and/or with respect to the implemented software. As an illustrative example, there is visibly no outward difference between a two-wheel driven Mercedes Benz S 300, having a Diesel engine producing 100kW, and a four-wheel driven Mercedes Benz S 600, having an Otto engine producing 300kW; however, the two cars will obviously be very different in operation, as will the apparatus recited in Claim 7 of this and the '564 application.

For at least the foregoing reasons, Applicants respectfully submit that the subject matter of Claim 7 is separately patentable over the subject matter of Claim 7 in the '564 application, and therefore respectfully requests withdrawal of the rejection thereof.

## **Conclusion**

Applicant respectfully submits that the present patent application is in condition for allowance. An early indication of the allowability of this patent application is therefore respectfully solicited.

If Mr. Cocks believes that a telephone conference with the undersigned would expedite passage of this patent application to issue, he is invited to call on the number below.

It is not believed that extensions of time are required, beyond those that may otherwise be provided for in accompanying documents. If, however, additional extensions of time are

necessary to prevent abandonment of this application, then such extensions of time are hereby petitioned under 37 C.F.R. § 1.136(a), and the Commissioner is hereby authorized to charge fees necessitated by this paper, and to credit all refunds and overpayments, to our Deposit Account 50-2821.

Respectfully submitted,

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